```
**********************************************************
*                                                        *
*          QQQQQQQ      ZZZZZZZZZ    XX      XX         *
*         QQQQQQQQQQ    ZZZZZZZZ      XX    XX          *
*         QQ      QQ         ZZ       XX XX             *
*         QQ      QQ        ZZ          XXX              *
*         QQ      QQ       ZZ           XXX              *
*         QQ    QQ QQ     ZZ            XX XX            *
*         QQQQQQQQQQ    ZZZZZZZZ       XX   XX          *
*          QQQQQQQQ     ZZZZZZZZZ    XX      XX         *
*                QQ                                      *
*                                                        *
**********************************************************
```


The Journal Covering Amateur Radio & Sinclair Computers
ZX-80; Micro-Ace; ZX81; T/S 1000, 1500, & 2068; QL

2025 O'Donnell Drive
Las Cruces, New Mexico
88001

K5XY
Alex. F. Burr
Publisher

W4GHV
Bo Barry
Editor

Volume 5 Number 7 ($1.50-issue) June 1987

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* Real Time Morse Code Generator (ZX81/TS1000), K2MI
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American Quad Configurations

by Dr. R.L. Schatz, WA3GWY &
Joseph Blihar, W3LDV
TS-2068 Translation & Graphics
by Bob Howard, WA6DLI
From 73 Magazine, May 1982
An All Band Horizontal Loop
(WD4CPK/DF3T German Quad

This looks like an ideal antenna. It is really a horizontal loop and in the words of the builders... the best wire antenna they have ever encountered. Very noise-free and all band, even in the smaller versions. It could be entered into a TS-1000/ZX-81 if edited to single line statements and skipping sections on SWR calc (using Data) and the graphics (line 3000 on).

Typical Printout

```
Designed Especially for Alex K5XY
Available Length 150  Width 75
You have enough room for an 80 meter German
Quad Antenna!
(The program listing appears elsewhere in
this issue.)
```

```
                    70.8
          LOOP FREQ 3.55
        VALUES IN FEET!
   H
   HFL
   H
   H
COAXH   H=LADDER LN 2-3"

FLATTOP LENGTH   EA.SIDE FEEDL
**********************************
257.69    283.1        70.77   12.7


FOR BAND CHARACTERISTICS OF THE
ANTENNA,PRESS ENTER
```

```
          30          29
        CONFIGURED QUAD
          LOOP FREQ.7
        VALUES IN FEET!
                          SL
STUB 2-3"SPACING          COAX>

FLATTOP LENGTH   EA.SIDE FEEDL
**********************************
116       139.56
STUB LGTH    2 SD      2 SD
**********************************
10.79
                30      29

FOR BAND CHARACTERISTICS OF THE
ANTENNA,PRESS ENTER
```

```
++++++++++++++++++++++++++++++
#UV's FREQ. AND SWR
++++++++++++++++++++++++++++++
*******20 METERS*******
2    14
2    14
SWR IS 1.2:1 OR LESS
2.0114.05

2.0114.05

SWR IS 1.2:1 OR LESS
2.0114.1

2.0114.1

SWR IS 1.2:1 OR LESS
2.0214.15

2.0214.15

SWR IS 1.2:1 OR LESS
```

Real-Time Morse Code Tone Generator
for ZX-81, ZX-80, TS-1000
Marty Irons, K2MI

This program allows the operator to enter data continuously. Each character is converted to Morse code, which is sent out through the microphone line as soon as the key is depressed. You can vary the speed or tone generated at any time. "Canned" messages are included.

You must first load the 60 bytes in the REM statement with the following decimal values. (36 bytes for translate table and 24 bytes for tone generator program).

```
63 62 60 56 48 32 33 35 39 47 6 129 133 9 2
132 11 128 4 30 13 130 7 5 15 134 27 10 8 3
12 136 14 137 29 131 243 38 24 46 128 14 128
65 211 255 16 254 65 219 254 16 254 45 32 241
37 32 236 201
```

Next, delete lines 11 thru 16. Type RUN, enter desired speed. Each character entered will be "sent" out the microphone line as soon as entered. You may enter any letter, number, period, comma, slant bar, or question mark. You MAY NOT, REPEAT NOT, enter a space. Because you terminate the run as soon as you enter a space.

To change speed, enter an asterisk (*), then enter the new speed desired. You may also increase the speed by 2 WPM each time you enter "FAST", or lower the speed by 2 WPM each time you enter "SLOW". Up to 9 canned messages may be selected by entering an equal sign, then the number of the message to be sent.

```
1   REM ..................... exactly 60 dots
11  FOR K = 16514 TO 16573
12  INPUT N
```

```
13  POKE K,N
14  PRINT K,PEEK K;TAB 22;CHR$ PEEK K
15  NEXT K
16  LIST
45  CLS
50  PRINT AT 10,8;"WPM = ";
60  INPUT S
70  PRINT AT 10,15;S;" "
80  LET M$ = INKEY$
85  LET N = 1
90  LET M = CODE(M$)
95  IF M ) 27 AND M ( 64 THEN GOTO 140
100 IF M$ = "" OR M = 118 THEN GOTO 80
112 IF M = 0 THEN GOTO 192
114 IF M = 228 THEN GOTO 300
116 IF M = 229 THEN GOTO 320
118 IF M = 20 THEN GOTO 380
120 IF M = 23 THEN GOTO 45
122 IF M = 114 THEN GOTO 340
124 IF M = 115 THEN GOTO 360
132 IF M = 15 THEN LET N = 76
134 IF M = 24 THEN LET N = 41
136 IF M = 26 THEN LET N = 115
138 IF M = 27 THEN LET N = 106
139 GOTO 159
140 LET N = PEEK(16486+M)
150 IF N ) 100 THEN LET N = N - 112
159 LET X = N - INT (N/2)*2
160 LET I = (35 + 70 * X) / S
165 IF I ( 1 THEN LET I = 1
170 POKE 16554,I
180 RAND USR 16550
190 LET N = INT (N/2)
192 LET T = 1
194 IF N ( 2 THEN LET T = 4
200 FOR M = 1 TO (70 * T) / S
210 NEXT M
220 IF N ) 1 THEN GOTO 159
230 LET M$ = M$(2 TO )
240 GOTO 90
300 LET S = S -2
310 GOTO 70
320 LET S = S + 2
330 GOTO 70
340 POKE 16556,PEEK 16556 + 1
350 GOTO 80
360 POKE 16556,PEEK 16556 - 1
370 GOTO 80
380 IF INKEY$ () "" THEN GOTO 380
385 IF INKEY$ = "" THEN GOTO 385
390 LET M$ = INKEY$
400 GOTO 400 + 10 * VAL M$
410 LET M$ = "CANNED MESSAGE 1"
415 GOTO 85
420 LET M$ = "CANNED MESSAGE 2"
425 GOTO 85
430 LET M$ = "CANNED MESSAGE 3"
435 GOTO 85
440 LET M$ = "CANNED MESSAGE 4"
445 GOTO 85
450 LET M$ = "CANNED MESSAGE 5"
455 GOTO 85
460 LET M$ = "CANNED MESSAGE 6"
465 GOTO 85
470 LET M$ = "CANNED MESSAGE 7"
475 GOTO 85
480 LET M$ = "CANNED MESSAGE 8"
485 GOTO 85
490 LET M$ = "CANNED MESSAGE 9"
495 GOTO 85
999 STOP
```

Note: The audio output from the microphone line is at a very low level, and must be amplified to be heard.

Here's the tone generator routine in case you want to study it. It is the last 24 bytes of the REM statement.

ADDRESS	CODE	MNEMONICS AND REMARKS
16550	243	DISABLE INTERRUPTS
51	038	LD H,24
52	024	
53	046	LD L, 128 ;INITIAL SPEED
54	128	
55	014	LD C, 128 ;INITIAL PITCH
56	128	
57	065	LD B,C
58	211	OUT 255,A ;OUTPUT
59	255	
16560	016	DJNZ,16560 ;WAIT
61	254	
62	065	LD B,C
63	219	IN 254,A ;ECHO OUTPUT
64	254	
65	016	DJNZ,16565 ;WAIT
66	254	
67	045	DEC L
68	032	JR NZ,16555 ;LOOP
69	241	
16570	037	DEC H
71	032	JR NZ,16553 ;LOOP
72	236	
73	201	RETURN TO BASIC

ZX-81/TS-1000 RTTY Receive Program
Dallas Williams, WA0MRG

Here's a neat RTTY program that copies RTTY for you. The author interfaced his ZX-81 directly to his home made TU. (I'm assuming TTL signals.) He connected his TU to pin 20 of IC1 in the ZX-81. It is for a 16K machine. Here's details:

This short RTTY receive program overcomes some of the shortcomings like timing problems and limited display found in some other programs. The program is somewhat difficult to load so follow directions closely. First, key in only the first 3 REM statements in the program listed at the end

of the article. Then key in the following short program:

```
100 FOR N=16526 TO 16561
110 INPUT M
120 POKE N,M
130 PRINT N;"=";PEEK(M)
140 NEXT N
```

Next, RUN this routine, keying in the following machine code:

14 0 6 5 219 0 203 127 32 250 22 25 30 234 29 32 253 21 32 248 219 0 203 39 203 17 22 20 5 32 237 33 0 0 105 201

After running this, delete lines 100-140. Then re-do line 3: (see note below first)

```
 3 REM #T#O#HNM#LRGIPCVEZDBSYFXAWJ#UQK##5#9
       #@,.#)4+80:;3""$?#6./-2""#71(#
```

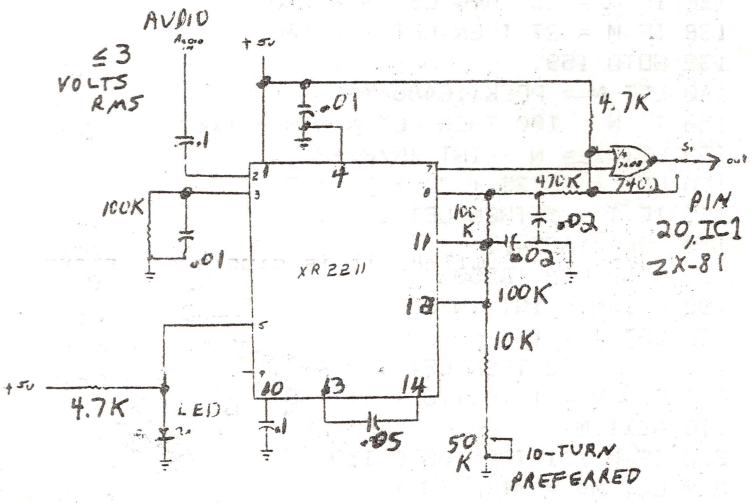
Note: @ is equal to the pound sign, + is the &, "" is the quote image (shifted Q), and is used for both " and the ', and the period following the 6 is used as !.

After the machine code and translate table are entered and checked, the remainder of the program should be entered. After entering, store on tape, BEFORE running. Then RUN, and after about 2600 characters are received, the print out will start. The actual number of characters stored and printed is less than 2600 because a 'blank' (bits 00000) are stored but not printed. To display before 2600 characters have passed, press BREAK followed by GOTO 200. Because of the SCROLL statements, a RUN command may be sluggish, To adjust the speed to get error free copy, POKE a value plus or minus 234 into location 16539. If that doesn't work try POKE 16553,19. This will change the timing loops in the machine code, which is based on that written by W9HLQ.

```
1   REM "RTTY"
2   REM ........ 36 DOTS FOR ML ROUTINE
3   REM
4   FAST
5   DIM A(2600)
6   LET Z = 0
9   LET J = 0
90  FOR N = 1 TO 2600
100 LET Z = USR 16526
110 IF Z = 0 THEN NEXT N
120 IF Z = 4 THEN LET J = 0
130 IF Z = 27 THEN GOTO 160
140 IF Z = 31 THEN GOTO 180
150 LET A(N) = (Z+J)
160 IF Z = 27 THEN LET J = 32
170 NEXT N
180 LET J = 0
190 NEXT N
200 SLOW
210 LET B = 0
220 SCROLL
230 FOR N = 1 TO 2600
240 IF A(N) = 0 OR A(N) = 32 THEN GOTO 240
250 PRINT CHR$ (PEEK (16568 + A(N)));
260 LET B = B + 1
270 IF B = 31 THEN SCROLL
280 IF B = 31 THEN LET B = 0
290 NEXT N
```

Simple RTTY TU Circuit
Dallas Williams, WA0MRG

This simple RTTY terminal unit provides a TTL output that can be connected directly to the ZX-81. Shown is a two position switch to allow for 'inversion', but an additional position is recommended to keep it from messing up tape loading. The LED is used as a tuning indicator and works reasonably well on 170 Hz shift signals. It will go out when the PLL is locked on frequency. A scope should be used for tuning shifts greater than 425 Hz.



TTL RTTY INTERFACE FOR ZX81

WA0MRG/0

QZX FRIENDS

WA3AIT -- Ed sent quite a long letter. In it he tells of his equipment which includes four T/S 1000's and a ZX81. He also has a printer, three timex 16K RAMS, 16K and 32K Memotech RAMS, and external plug in keyboards for all the computers. He also picked up some neat keyboards at Dayton this year. He has been on cw in the past but is now working on a RTTY setup. This two favorite programs are DXCC to which he has added a hard copy module and TSMUF to which he has added some ideas from the sunrise sunset program from KA2LHO.

WA6OUC -- Warren has renewed. He has been with us since we started with qzx.

KE6WB -- Ed renewed for TWO years,

showing great faith. He has been with us almost as long as WA6OUC.

Packet Works Again
K5XY

Monday when I got to the office where I keep my packet set up I was just in time to see the identification packet from N5ICC, the local public bulletin board station, scroll across the screen. That packet said that I had mail waiting, so I reached for the keyboard of the T/S 1500 with Comlink I interface to connect.

At this point the RAM pack wobbles struck again and the screen went blank. As readers know, the Comlink I is an interface box which looks like a 16 K RAM pack (see also the ad in this issue). It attaches to the T/S 1000, T/S 1500, and ZX 81 just like the Ram pack and has the same difficulties that the RAM pack has. That is, an intermittent develops in one of the contacts of the connector to the board and causes the computer to crash. The cure is reasonably simple. Clean the contacts regularly or build a short flexible cable connecting the RAM pack to the computer. I have done this last step but it was not installed on this day.

With the Comlink, it is simple to start up the computer after a crash. Just unplug and reconnect the computer to the AC line and enter the simple one line program that calls the Comlink I interface, run it, and push ENTER twice. You are then reconnected to your packet TNC in the default mode, which is what I use all the time.

I then sent C N5ICC to call up the local PBBS packet station. It came right back, automatically greeted me by name, and told me that there was mail waiting for me. I sent the simple command RM (for read my mail) and N5ICC replied with two messages left for me the day before by WA6OJJ, who was visiting in El Paso, fifty miles to the south.

One of the messages said that he was leaving El Paso at 9 AM Monday. It was now 8:55 so I decided to give him a call just in case he was listening. The packet path to El Paso goes through two of the new Net/Rom digipeaters which have been set up in the area around Las Cruces. These stations are regular packet repeaters with additional firmware which makes repeating through several digipeaters faster and easier.

I sent C CAB to connect to the mountain top repeater 60 miles to the north. Then I sent C ELP to connect to the El Paso Net/ROM repeater 110 miles to the south. I now had good coverage of the El Paso region. A simple C WA6OJJ put out a call for Bob.

As expected, he did not answer. I made the call before 9 AM but Bob is the pilot of a company plane, so when he says he is going to leave at 9 AM you can be sure that the plane will be ready to go then. But just in case the company changed its mind, I connected to the El Paso PBBS station and left a message for WA6OJJ. Now, whenever the PBBS station identified, it would announce that mail was waiting for WA6OJJ so he would be sure to pick it up if he could.

The information he left for me on the packet bulletin station is of great interest. Bob told me he had just acquired a T/S 2068 with dual disk drives. But more importantly, he said his T/S 1000 was working fine on packet. It is the basis for his portable packet station which he used with his Yaesu FT 208R handi-talkie. He has a Comlink I interface to his MFJ TNC. All the equipment fits into a brief case with a Radio Shack 2 inch TV as a monitor, and a 12 volt gell cell as a power supply. Bob has promised a more complete description of his set up when he gets done adding a few more items to it.

So although I did not get to talk to WA6OJJ in person as I did the last time he was in El Paso, packet saved the day. Bob was able to leave me interesting information even though I was not available. He could be sure that as soon as I was able I would receive his message and be able to to respond to it.

NET REPORT

We finally got a current report on an active Sinclair net. It is currently meeting on Saturday mornings on 7235 kHz LSB. The net control station is WA6OUC (see FRIENDS). QZX authors WA6DLI and WA6OJJ are active on the net.

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: TIMEX 1000 computer, model 2040 printer, NU4V's RTTY and CW programs, RTTY, CW, and Hunter EPROM modules in cases. Byte-Back RS-232 module. Documentation. $110 for all, I'll pay shipping. Tim Rulon, WA2KQD, 1604 Billman Lane, Silver Spring, MD 20902 301-946-7928

```
  35 REM ======================        Program by Dr.Richard L. .      Schatz WA3
GWY w/quad by          Joseph Blihar,W3LDV from         "Americanizing the German
      Quad" 73 Magazine May '82
  40 REM Box 31A RD&1 Paradise       Acres, Sugarloaf, PA 18249
  50 REM ======================
  55 REM TIMEX-SINCLAIR Computer      translation by WA6DLI 7/87
  60 PRINT
  61 POKE 23658,8
  62 INK 7: BORDER 1: PAPER 1: CLS
  65 PRINT
  70 INPUT "What is your name?";N$
  80 PRINT
  90 INPUT "AMATEUR CALL?";C$
 100 PRINT
 110 INPUT "What length (feet) is"'"available on your property?";L
 120 PRINT
 130 INPUT "What Width (feet) is availble?";W
 140 CLS : LET M=0: LET BQ=0: LET EL=0: LET TM=0: LET ct=0: LET j=0: LET A=0: LE
T FD=0: LET Z=0: LET B=0: LET S1=0: LET S2=0: LET BQ=0: LET LE=0: LET c=0: LET N
F=0: LET CQ=0: LET MQ=0: LET b1=0
 145 DIM M(66)
 150 DIM A(1)
 155 DIM X$(1)
 190 PRINT INK 3;TAB 4;"American Quad Configurations"'"     by Dr.R.L. Schatz,WA3
GWY &"'"    Joseph Blihar,W3LDV": PRINT ' INK 2;"   TS-2068 TRANSLATION/GRAPHICS
"'"   BY BOB HOWARD, WA6DLI"'"  FROM 73 Magazine May 1982"'"  An All Band Horiz
ontal Loop"'"
 (WD4CPK/DF3T German Quad)"
 200 PRINT AT 12,0; INK 4;"*** Designed Especially for***","     *** "; FLASH 1;N
$;" ";C$; FLASH 0;" ****"
 210 PRINT
 220 PRINT "Available Length ";L;TAB 23;"Width ";W
 230 IF ((l>50) AND (w>50)) AND (L>60) OR w>60 THEN PRINT '"You have enough room
 for an"'" 80-Meter German Quad Antenna!";: LET Z=1: LET C=0
 232 IF Z=0 THEN GO TO 249
 235 INPUT "Enter (1) for 160-40 M TriBand"'"       (2) for All-Band Antenna";a
 236 IF A>2 THEN GO TO 235
 238 IF a=1 THEN PRINT FLASH 1; INK 0;'"Selected 160-40 M TriBand"
 239 IF a=2 THEN PRINT FLASH 1; INK 0;'"Selected All-Band Antenna"
 240 LET fq=3.55: LET fl=1005/3.9: LET tw=1005/3.55: LET q=fl/4
 241 IF l=w THEN LET j=1
 242 IF l<>W THEN IF L>W THEN LET j=1
 243 IF l<>w AND l<w THEN LET j=1: LET le=1
 244 IF a=2 THEN GO TO 400
 245 IF a=1 THEN GO SUB 2050: GO TO 400
 249 PRINT '"You will have to construct  Quad with a lowest freq. in 40-Meter Ba
nd!": LET Z=0
 250 IF l>30 AND w>30 THEN LET MQ=1
 260 INPUT "What is lowest center freq."'" you want (MHz)?";FQ
 270 PRINT '"Lowest Desired CENTER FREQ"'" is: ";fq;" MHz"
 280 LET fl=1005/7.2: LET tw=1005/fq: LET q=fl/4
 290 IF fd<0 THEN LET fd=0
 300 IF l<=30 OR w<=30 THEN GO TO 520
 400 IF nf=1 OR mq=0 OR cq=1 THEN LET bq=1
 410 IF a=2 OR mq=1 THEN LET fd=(tw-fl)/2: LET fd=(fd*.6)+fd: LET sl=fd*.4
 420 IF fd>28 THEN PRINT '"Area for Quad is NOT Large"'"enough. Design will have
"'"to be configured!": PAUSE 200: GO TO 520
 430 IF bq=1 THEN GO SUB 3000: GO SUB 2170
```

```
 440>PRINT
 450 IF mq=1 THEN GO TO 500
 460 IF J>60 THEN GO TO 620
 470 PRINT
 480 IF b1=0 THEN GO TO 520
 490 PRINT
 500 PRINT TAB 5;"MINIATURE AMERICAN QUAD": LET C=1
 510 GO SUB 3000: GO SUB 2170: GO TO 620
 520 PAUSE 200: PRINT : PRINT : PRINT
 530 PRINT "CONFIGURED  Antenna""(Fit All available Space)": PRINT
 540 PRINT : PRINT : PRINT
 550 LET cq=1: LET c=1
 560 LET S1=(q-1)*2: LET s2=(q-w)*2
 570 LET e1=(s1+s2)/2
 580 IF e1<0 THEN LET j=j+e1: LET 1=j
 590 IF e1>16 THEN CLS : PRINT "Design Cannot Be Configured"" With These Dimens
ions": GO TO 110
 600 LET f1=2*w+2*1: LET tw=f1+2*e1
 610 PRINT : GO SUB 3000: GO SUB 2175
 620 IF CQ=1 THEN PRINT AT 2,10;L;AT 2,22;W
 621 PRINT AT 20,0;"FOR BAND CHARACTERISTICS OF THE ANTENNA,PRESS ENTER":
 622 IF BQ=1 OR MQ=1 THEN PRINT AT 2,22;INT (Q*10+.5)/10;AT 2,22;INT (Q*10+.5)/1
0
 623 PAUSE 0
 624 PRINT AT 20,0;"FOR BAND CHARACTERISTICS OF THE ANTENNA,PRESS ENTER":
 630 PAUSE 0
 640 CLS : GO SUB 1740
 650 FOR i=1 TO 11
 655 IF M=148 THEN RESTORE
 670 READ m: IF tm=1 THEN IF m<14.0 THEN GO TO 670
 675 IF C=2 AND CQ=0 AND M<7 THEN RESTORE 1650: GO TO 670
 678 IF C=5 AND A=2 AND M=29.3 THEN GO TO 670
 680 IF cq=1 THEN IF m<7.0 THEN GO TO 670
 685 IF A=2 AND M=148 THEN PAUSE 150: GO TO 2040
 690 IF x$<>"" THEN IF m=148 THEN GO TO 2000
 700 LET qw=1005/fq
 710 LET qd=1005/m
 720 LET qx=qd/qw
 730 IF qx<.7 THEN PRINT INK 4;INT ((QW/QD)*100+.5)/100;TAB 4;  INK 2;m;TAB 7: PA
USE 100
 740 PRINT INK 4;INT (1/QX*100+.5)/100;TAB 4;  INK 2;m;TAB 7: PAUSE 100
 750 IF qx>=.482 AND qx<=.488 THEN PRINT "SWR IS 1.5:1 OR LESS"
 760 IF qx>=.489 AND qx<=.503 THEN PRINT "SWR IS 1.2:1 OR LESS"
 770 IF qx>=.504 AND qx<=.509 THEN PRINT "SWR IS 1.6:1 OR LESS"
 780 IF qx>=.510 AND qx<=.531 THEN PRINT "SWR IS 2.5:1 OR LESS"
 790 IF qx<.585 AND qx>.550 THEN PRINT "SWR IS 1.8:1 OR LESS"
 800 IF qx>=.532 AND qx<=.536 THEN PRINT "SWR IS 2.6:1 OR LESS"
 810 IF qx>=.537 AND qx<=.552 THEN PRINT "SWR IS 2.8:1 OR LESS"
 820 IF qx>=.993 AND qx<=1 THEN PRINT "SWR IS 1.4:1 OR LESS"
 830 IF qx>=.979 AND qx<=.986 THEN PRINT "SWR IS 2.6:1 OR LESS"
 840 IF QX>1.8 AND QX<2 THEN PRINT "SWR IS 1.8:1 OR LESS"
 850 IF qx>=.970 AND qx<=.978 THEN PRINT "SWR IS 2.7:1 PLUS"
 860 IF QX>.333 AND QX<.337 THEN PRINT "SWR IS 2.1:1 OR MORE"
 870 IF qx>=.337 AND qx<=.345 THEN PRINT "SWR IS 2.1:1 OR LESS"
 880 IF QX>.242 AND QX<.245 THEN PRINT "SWR IS 1.7:1 TO 2:1"
 890 IF QX>.240 AND QX<.242 THEN PRINT "SWR IS OVER 3:1"
 900 IF qx>=.245 AND qx<=.248 THEN PRINT "SWR IS 1.6:1 OR LESS"
 910 IF qx>=.2482 AND qx<=.251 THEN PRINT "SWR IS 1.4:1 OR LESS"
```

```
 920>IF QX>=.2519 AND QX<=.2542 THEN PRINT "SWR IS 2.2-1.8:1"
 930 IF QX>=.2543 AND QX<=.256 THEN PRINT "SWR IS 2.7-2.2:1"
 940 IF QX>=.257 AND QX<=.259 THEN PRINT "SWR IS 3:1 OR MORE."
 950 IF QX>=.35 AND QX<=.38 THEN PRINT "SWR IS 2:1 OR MORE."
 960 IF QX>.161 AND QX<.1625 THEN PRINT "SWR IS 2.1:1 TO 2.5:1."
 970 IF QX<.167 AND QX>.164 THEN PRINT "SWR IS 1.7:1 TO 2.1:1."
 980 IF QX>=.167 AND QX<= 174 THEN PRINT "SWR IS 1.6:1 OR LESS."
 990 IF QX>=.1258 AND QX<=.128 THEN PRINT "SWR IS MIN. 2.5:1."
1000 IF QX>=.124 AND QX<=.125 THEN PRINT "SWR IS 2.2:1 TO 1.8:1."
1010 IF QX<.122 AND QX>.120 THEN PRINT "SWR IS 1.5:1 OR LESS."
1020 IF (QX>=.122) AND (QX<=.1237) THEN PRINT "SWR IS 1.5:1 OR LESS"
1030 IF QX>=.900 AND QX<=.947 THEN PRINT "SWR IS 2.5:1 TO 2.2:1."
1040 IF QX>=.047 AND QX<=.048 THEN PRINT "SWR IS 1.6:1 OR LESS."
1050 IF QX>=.0481 AND QX<=.051 THEN PRINT "SWR IS 1.6:1 TO 2.0:1."
1060 IF QX>.0239 AND QX<.0243 THEN PRINT "SWR IS 1.5:1 OR LESS"
1070 NEXT i
1072 IF M=148 AND CQ=0 THEN GO TO 2000
1075 IF m=148 AND cq=1 THEN GO TO 1880
1076 IF M=7.3 AND A=1 THEN GO TO 1880
1078 IF X$<>"" AND M=29.3 THEN GO TO 2000
1080 CLS : GO SUB 1740
1090 GO TO 650
1630 DATA 3.5,3.55,3.6,3.65,3.7,3.75,3.8,3.85,3.9,3.95,4.0
1650 DATA 7.0,7.025,7.050,7.1,7.125,7.150,7.2,7.225,7.250,7.275,7.3
1670 DATA 14.0,14.05,14.1,14.15,14.2,14.225,14.250,14.275,14.3,14.325,14.35
1690 DATA 21.0,21.1,21.2,21.250,21.3,21.325,21.35,21.375,21.4,21.425,21.450
1710 DATA 28.3,28.4,28.5,28.6,28.7,28.8,28.9,29.0,29.1,29.2,29.3
1730 DATA 146,146.2,146.4,146.6,146.8,147,147.2,147.4,147.6,147.8,148
1740 PRINT "++++++++++++++++++++++++++++++"
1750 PRINT INK 4;"£WV's";" "; INK 2;"FREQ."; INK 7;" ";" AND SWR"
1760 PRINT "++++++++++++++++++++++++++++++"
1770 IF C>0 THEN GO TO 1790
1790 LET c=c+1: IF c=1 THEN PRINT "****** 80 Meters ******"
1800 IF C>6 AND A=2 THEN RETURN
1810 IF C=2 THEN PRINT "*******40 METERS*******"
1820 IF C=3 THEN PRINT "*******20 METERS*******"
1830 IF C=4 THEN PRINT "*******15 METERS*******"
1840 IF C=5 THEN PRINT "*******10 METERS*******":
1850 IF C=6 THEN PRINT "*******2 METERS*******": LET C=0
1870 IF C=3 AND A=1 THEN GO TO 1880
1875 RETURN
1880 IF A=1 THEN PRINT '"SWR ON 160 METERS IS 1.8:1 OR LESS": GO TO 1885
1882 GO TO 1890
1885 PRINT TAB 2;"SWR FROM 14.1 TO 21.5 IS OVER 2.5:1": PRINT TAB 2;"SWR FROM 28
.8 TO 29.5 IS 2.2:1 OR LESS": PRINT TAB 2;"SWR ON 2 METERS IS 1.5:1 OR LESS"
1890 PRINT "                                    ": PRINT "***END OF COMPUTATIONS***"'
"HIT ""RUN"" TO START AGAIN"
1900 STOP
2000 PRINT
2010 IF CQ=1 THEN PRINT "DO YOU WANT TO ALTER "'"THE DETUNING STUBS"'"FOR 20-10
METERS (Y/N)?": INPUT Y$
2020 IF Y$="" THEN GO TO 2010
2021 IF Y$="N" THEN GO TO 2040
2022 CLS : LET CT=CT+1: IF CT<2 THEN LET QF=FQ
2025 LET TM=1: LET C=2: RESTORE : INPUT "RESONATE 100 KHZ HIGHER OR LOWER?(H/L)"
;X$: IF CT>1 THEN LET FQ=QF
2026 IF X$="L" OR X$="l" THEN LET FQ=FQ-.10: IF FQ<3.45 THEN CLS : PRINT "STUBS
WILL BE TOO LONG": GO TO 2000
```

```
2027>IF X$="L" AND FQ>=3.45 THEN PRINT "==REFIGURE FOR 100 KHZ LOWER ==": GO TO
560
2028 IF X$="H" THEN LET FQ=FQ+.10: PRINT "==REFIGURE FOR 100 KHZ HIGHER ==": GO
TO 520
2040 CLS : PRINT "CALCULATIONS NOW COMPLETE!": STOP
2050 REM no feeders 160-40 ONLY
2055 LET nf=1
2070 LET q=(1005/fq)/4
2090 LET fd=(TW-FL)/2
2110 IF fd<0 THEN LET fd=0
2130 RETURN
2170 REM PRINT AT 11,0;TAB 8;"TOTAL";TAB 16;"EACH";TAB 24;"MAX."
2175 PRINT AT 12,0;"FLATTOP";TAB 8;"LENGTH";TAB 16;"EA.SIDE";TAB 24;"FEEDL"
2190 PRINT "**********************************"
2210 PRINT INT (FL*100+.5)/100;TAB 9;INT (TW*100+.5)/100;TAB 17;: IF BQ=1 OR MQ=
1 THEN PRINT AT 14,19;INT (Q*100+.5)/100;TAB 26;INT (FD*100+.5)/100:
2215 IF LE=1 THEN PRINT AT 17,0;"PULL SLIGHT OVER-LENGTH THROUGH"'"TO CREATE FEE
D POINT": LET LE=0
2250 PRINT "          ": IF MQ=1 OR A=1 OR A=2 THEN GO SUB 4000: RETURN
2270 PRINT "STUB LGTH";TAB 12;"2 SD";TAB 20;"2 SD"
2290 PRINT "******************************"
2300 IF CQ=1 THEN PRINT INT (EL*100+.5)/100
2310 IF CQ=1 THEN PRINT TAB 14;L;TAB 21;W: GO SUB 4000: RETURN
2330 IF BQ=1 THEN PRINT INT (SL*100+.5)/100: GO SUB 4000: RETURN
2340 PRINT "FEEDPOINT SPACING = 2 TO 4 INCHES"
2345 STOP
2999 REM QUAD SCHEMATIC
3000 PAUSE 500: CLS
3010 PLOT 30,130: DRAW 110,35: DRAW 110,-35: DRAW -110,-35: DRAW -110,35
3011 IF cq<>1 THEN PRINT AT 7,4; INK 2;"H";AT 7,5; INK 7;"FL"
3012 IF cq<>1 THEN PRINT AT 8,4; INK 2;"H"
3013 IF cq<>1 THEN PRINT AT 9,4; INK 2;"H"
3014 IF cq<>1 THEN PRINT AT 10,0;"COAX";AT 10,4; INK 2;"H";AT 10,7; INK 7;"H=LAD
DER LN 2-3""""
3016 IF cq<>1 THEN PRINT AT 6,4; INK 2;"H"
3017 IF CQ<>1 THEN : INK 2: PLOT 36,87: DRAW -35,0: DRAW 0,-2: DRAW 35,0: DRAW 0
,2: INK 7
3018 IF CQ=1 THEN INK 4: PLOT 245,127: DRAW 0,-40: DRAW 2,0: DRAW 0,40: INK 4: D
RAW 4,2: DRAW 0,-20: PLOT 244,126: DRAW -4,-2: DRAW 0,-20: INK 7
3019 IF CQ=1 THEN PRINT INK 2;AT 8,27;"SL";AT 10,25;"COAX>";AT 4,10;"CONFIGURED
QUAD";AT 10,0;"STUB 2-3""SPACING"
3020 PRINT INK 4; FLASH 1;AT 5,11;"LOOP FREQ.";FQ: FLASH 0
4000 PRINT AT 6,10;"VALUES IN FEET!": RETURN
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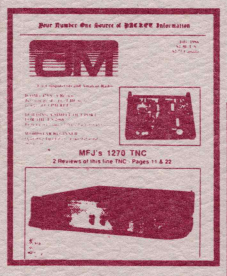

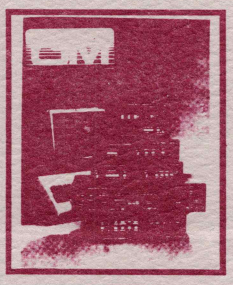

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